Project Nile:

Improved Hydrometeorological Information for the Countries of the Nile Basin

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Operatoinal Partners: USAID, RCMRD, NBI-ENTRO

The Nile Basin

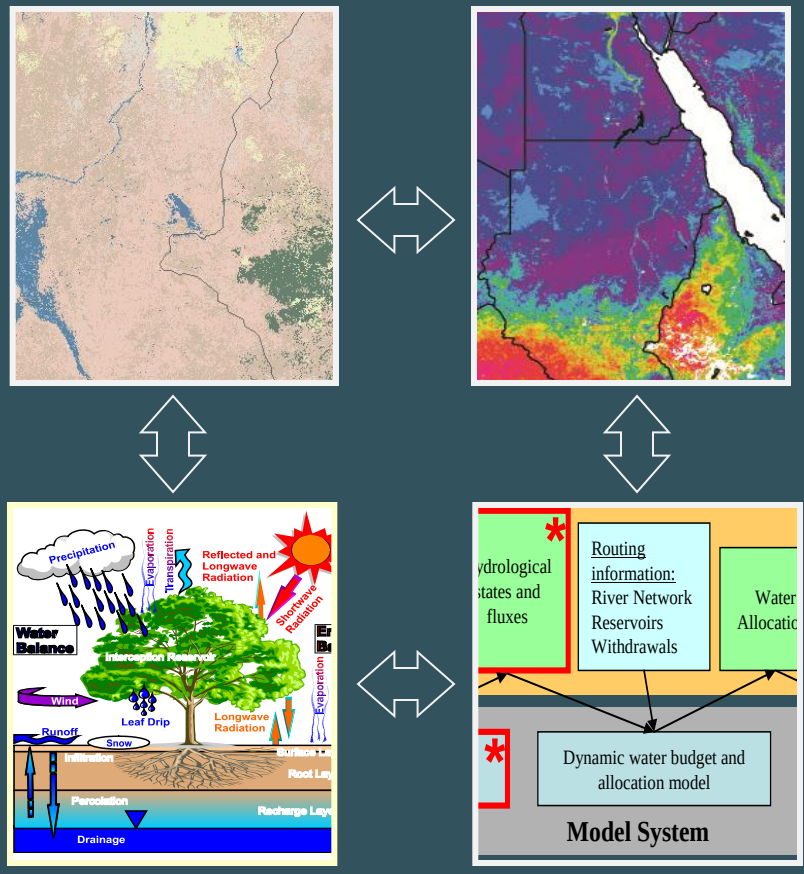
- 3.35 million km^2
- Climates range from humid tropical to hyper-arid
- Annual flow at Aswan: 84 BCM
- Large seasonal and interannual climate variability
- ~200 million people, 50% below the poverty line
- 11 countries

NASA's Project Nile

Goal: improved hydrometeorological information for research, planning, and water management

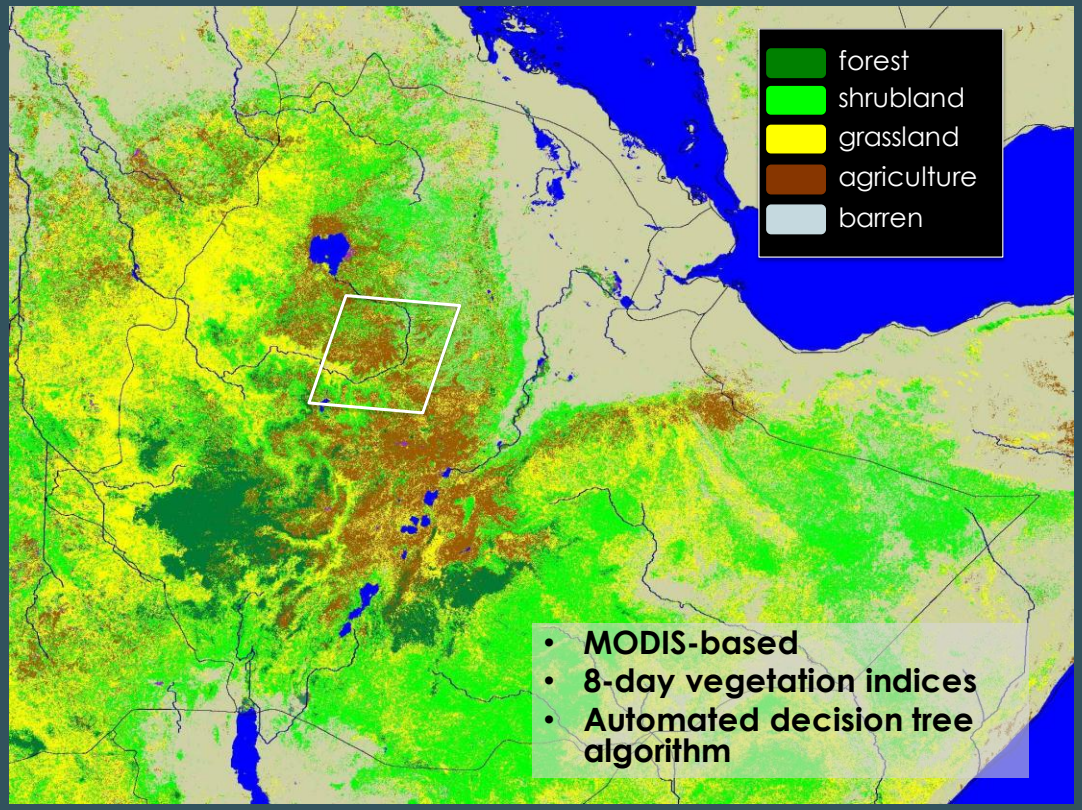
Components:

1. *Land cover mapping and simulation*
2. *Satellite-derived evapotranspiration*
3. *Optimized models for hydrological analysis*
4. *Integration to Decision Support*

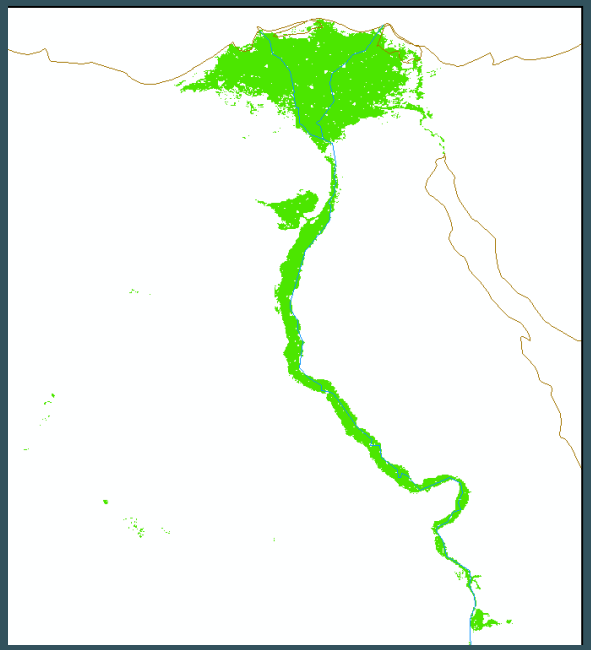


MODIS Land Cover Mapping

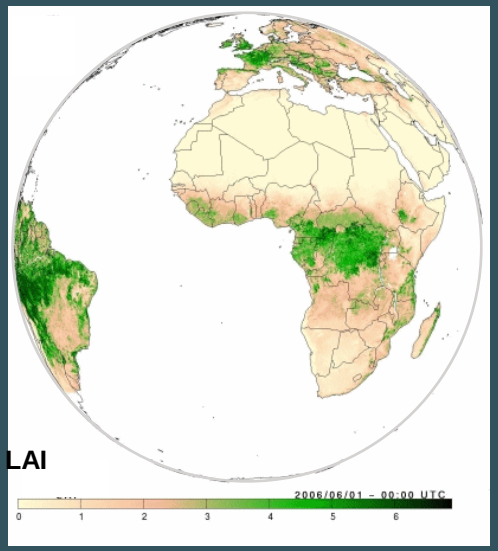
All land cover types

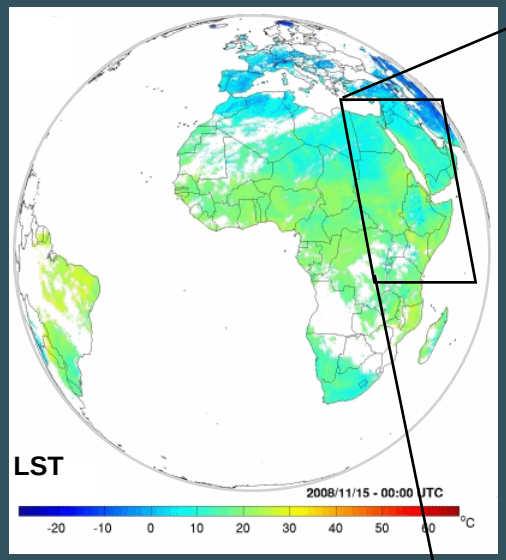


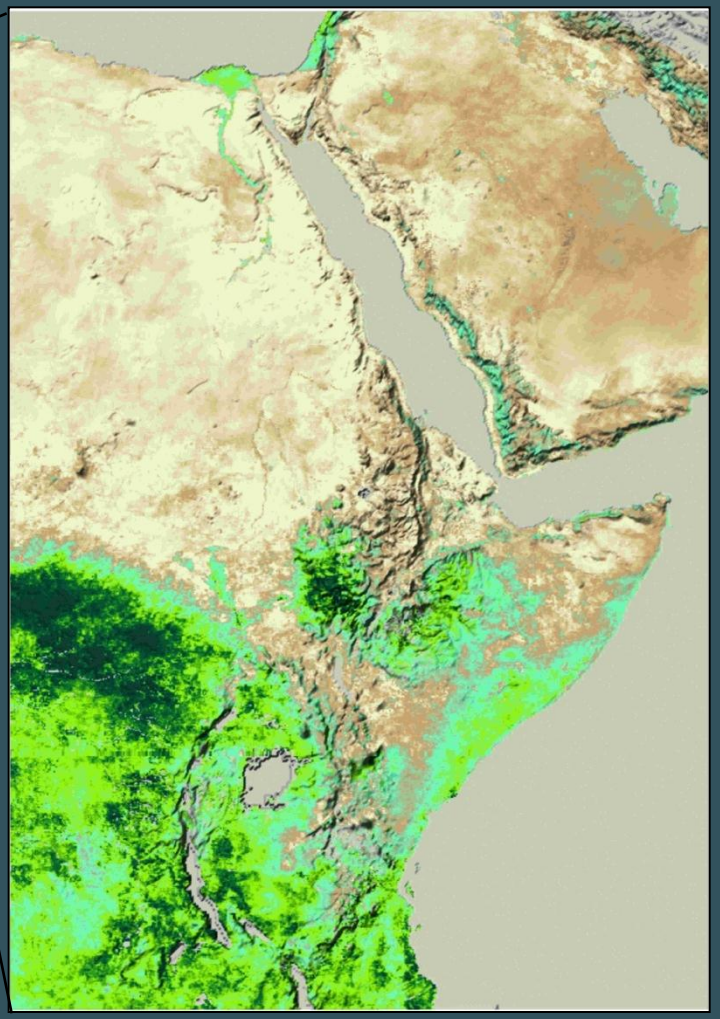
Irrigated areas



ALEXI Satellite-based ET



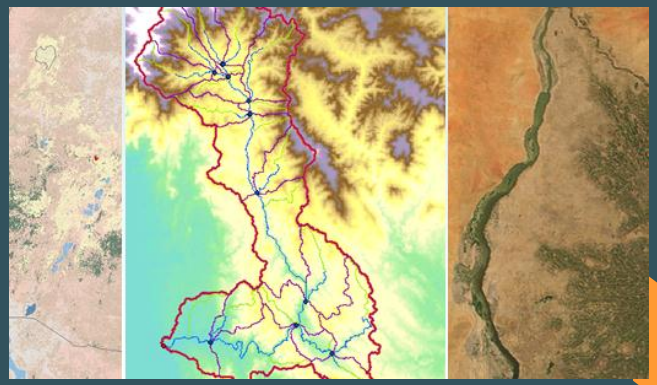




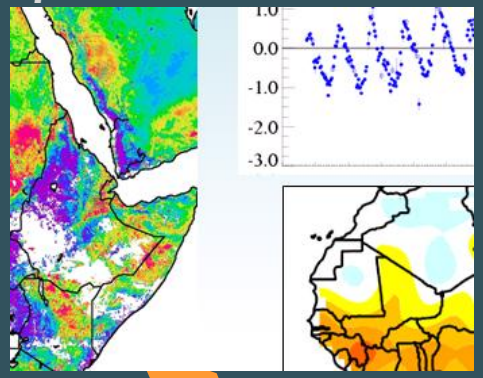
- Meteosat analysis at 3km resolution, daily
- MODIS thermal bands to downscale to 1km
- Further downscaling possible with Landsat and ASTER

The Nile Land Data Assimilation System

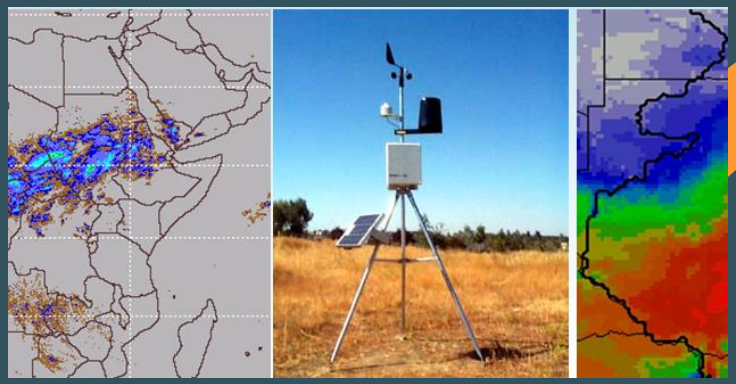
Landscape Information



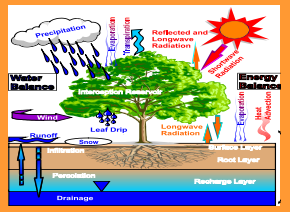
Update Observations



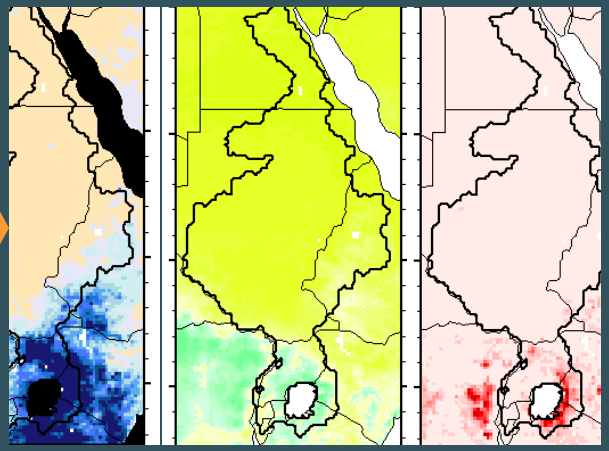
Meteorological Data



Land Surface Model

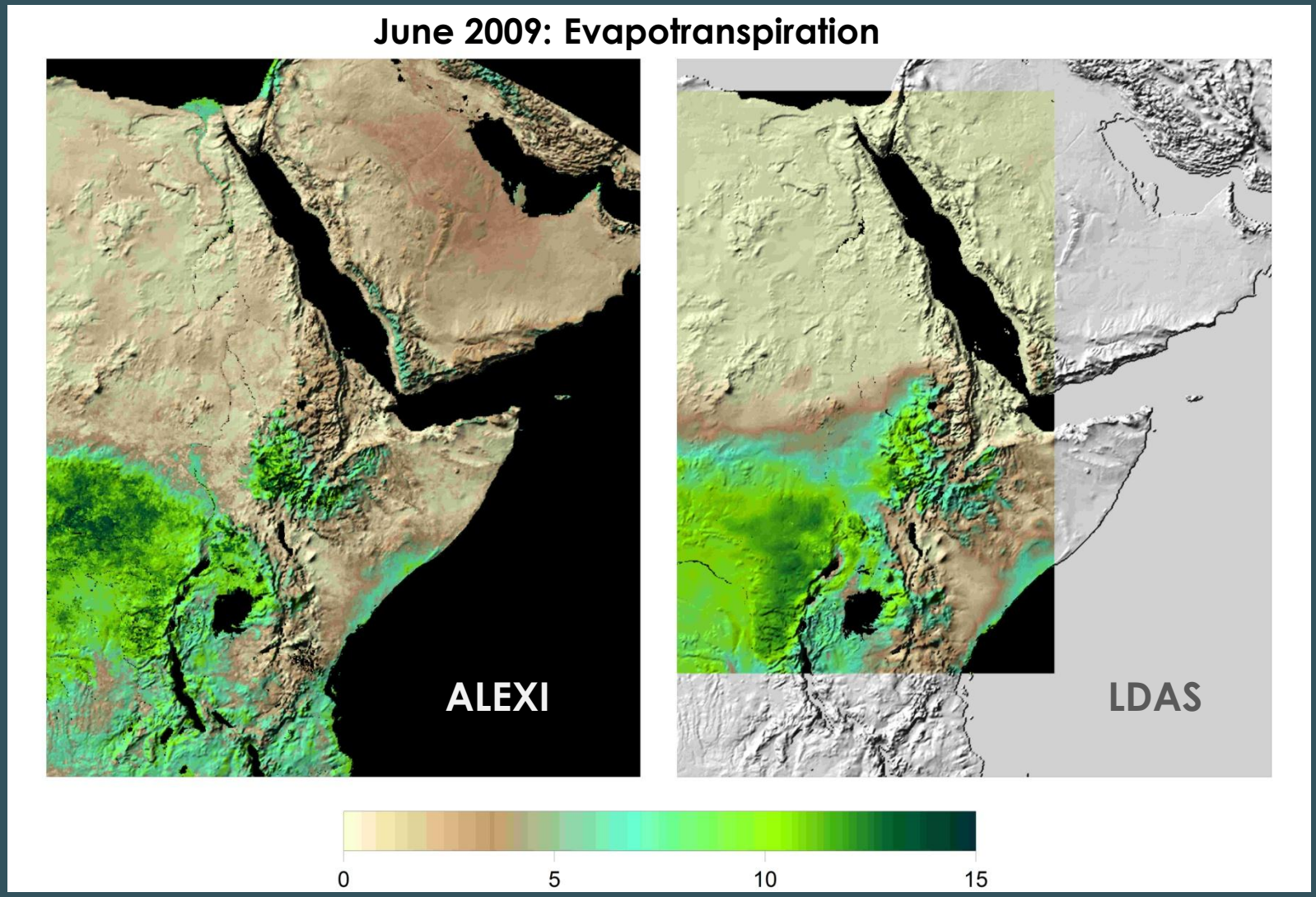


LDAS Output

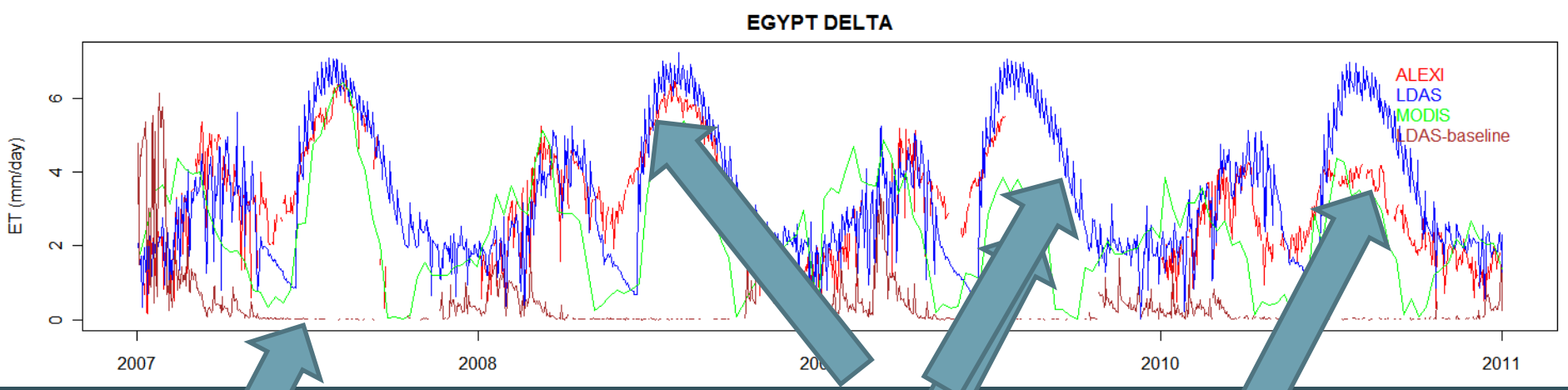


SM *ET* *Runoff*

ALEXI vs. Nile LDAS ET



Applications: Monitoring Irrigation Water Use



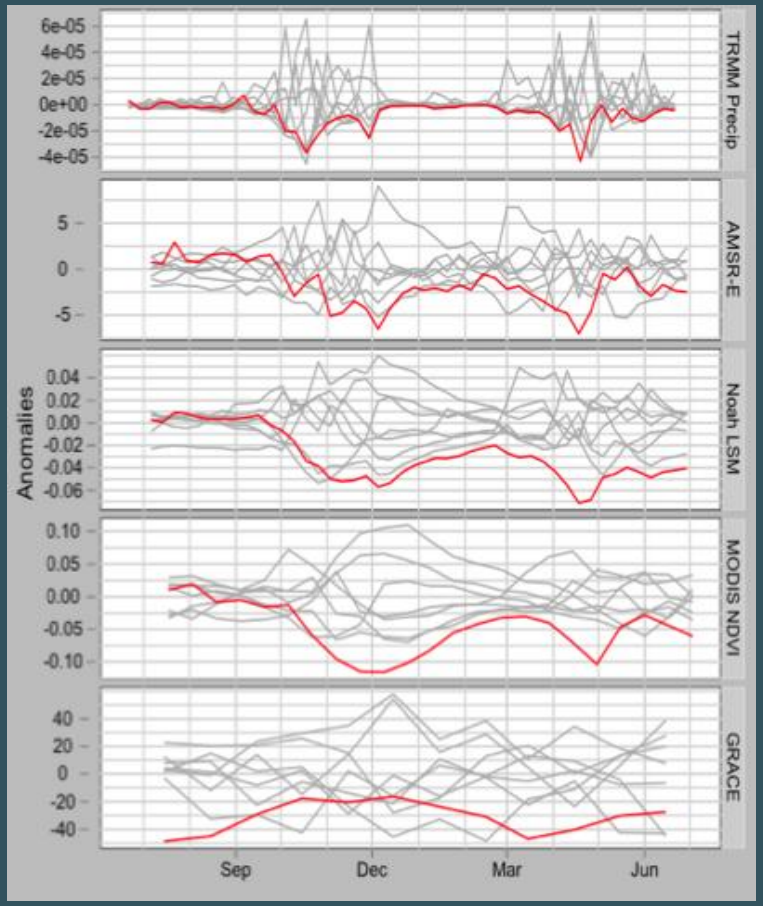
Models that lack realistic irrigation maps and routines missed ET from agriculture

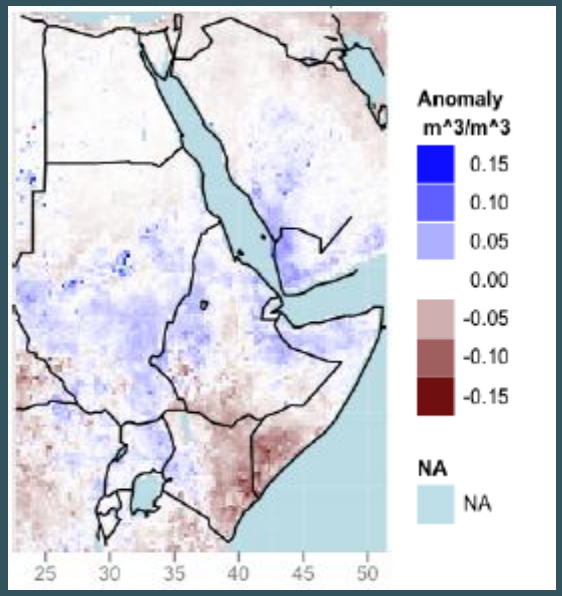
Other satellite algorithms that have not been systematically evaluated in this region may require further calibration

ALEXI and LDAS usually agree, and LDAS can fill data gaps in ALEXI

This disagreement between LDAS and ALEXI helped us to identify and fix a problem in 2010 Meteosat data

Applications: Drought Monitoring

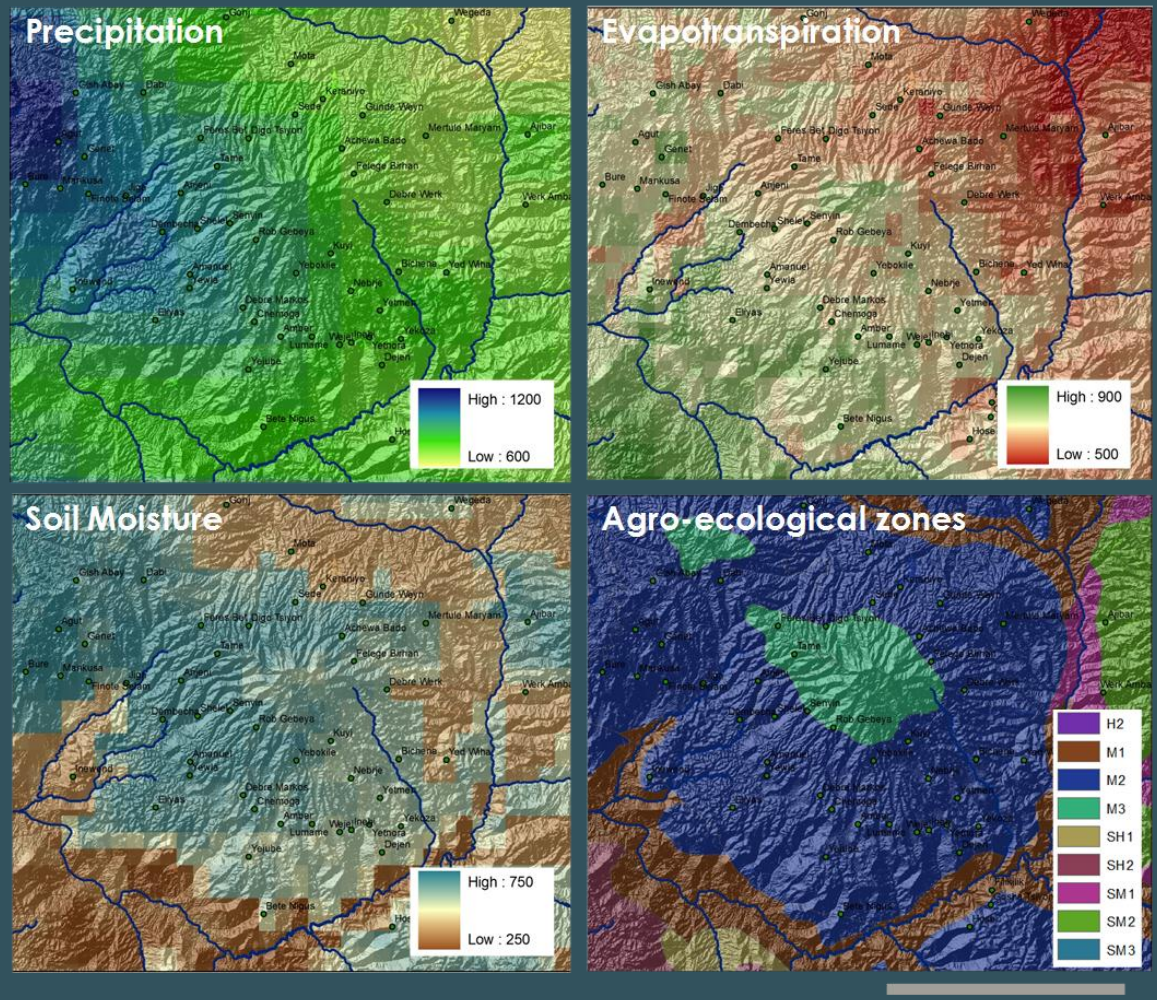




Anderson et al. (2012) *HESS*

Applications: Evaluating Food Security

Nile LDAS downscaled meteorology and model outputs are applied to statistical crop yield models



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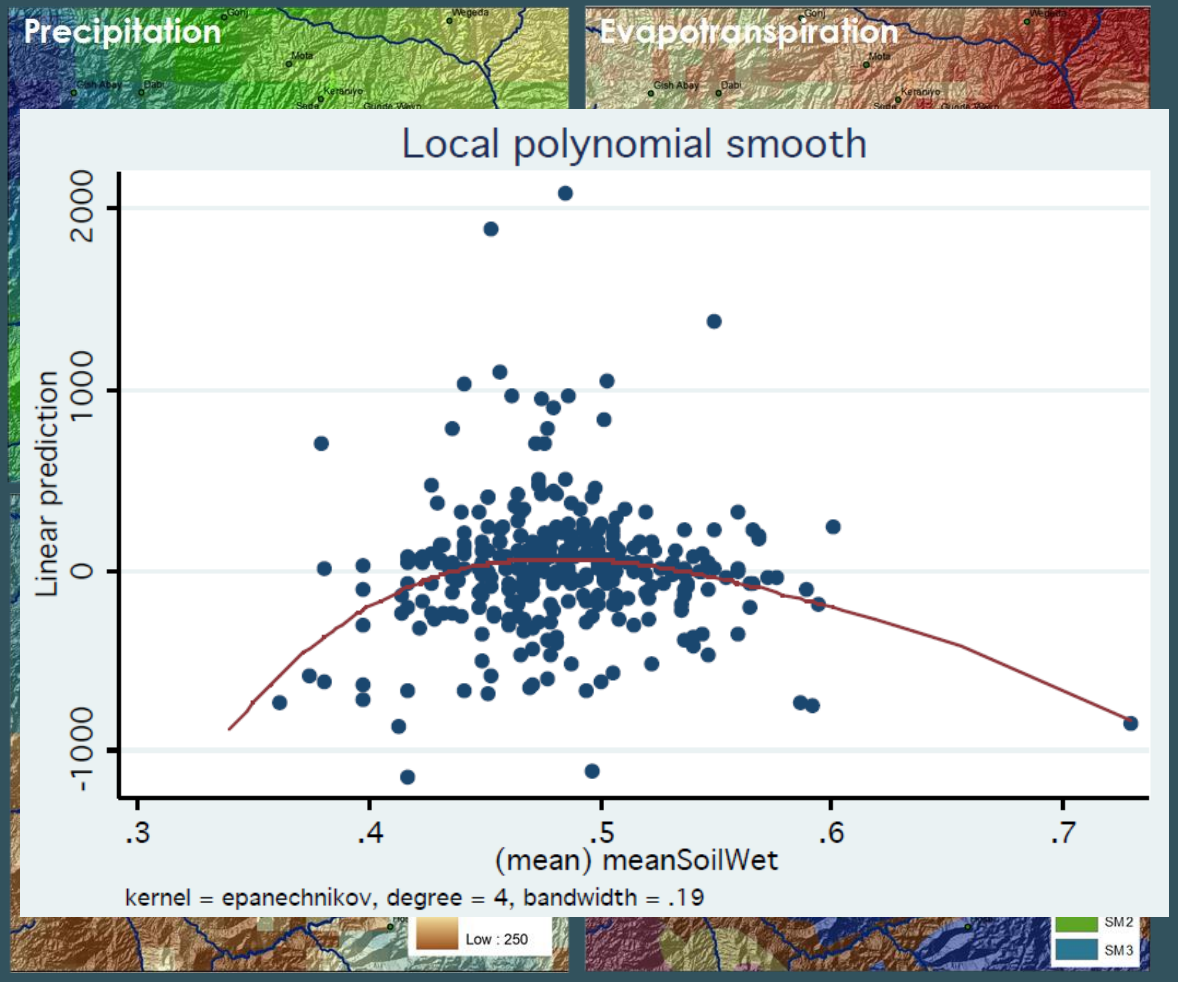

Accomplishments

- Preliminary irrigation maps, ALEXI products, and LDAS output complete and transferred
- Annual workshops held in first three project years.
- Evaluation of research products ongoing
- Project techniques applied to new UNDP and NSF projects
- Results reported in peer-reviewed publications and reports by partner agencies

Challenges

- Political and financial uncertainty for regional partners
- Mission creep
- Paucity of *in situ* evaluation data
- Ensuring project continuity

THANK YOU